REPORT

OF THE

MONROE

COAL AND IRON COMPANY'S

ESTATE,

IN

M'KEAN COUNTY,

PENNSYLVANIA.

1856.

nted by B. Bannan, Pottsville.

MAP
OF THE
McKEAN COUNTY,
PENNA
COAL & IRON DISTRICT.
WITH AVENUES TO MARKET.

JANUARY 1855.

DISTANCES

Smethport to Olean	30 miles
Bens Creek to Olean	45
Olean to Rochester	70
Olean to Syracuse	120
Olean to New York	280
Smethport to Pittsburg	90
Olean to Philadelphia	350

CANADA WEST

LAKE ONTARIO

NIAGARA ORLEANS MONROE WAYNE

ONEIDA LAKE

GENESEE

ONTARIO

SENECA CAYUGA

ERIE

WYOMING

LIVINGSTON YATES

LAKE ERIE

NEW YORK

TOMPKINS

CATTARAUGUS ALLEGHENY

CHAUTAUQUE

STEUBEN CHEMUNG

ERIE

WARREN

CRAWFORD

McKEAN

POTTER

TIOGA

PENNSYLVANIA

IRON MINES OF SMITHS, JAMESON & AHERN

COAL BEDS OF SMITH & WINANS & JAMESON

COAL BEDS OF SMITH, WINANS, & JAMESON HAMILTON & COWLEY

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REPORT

OF THE

MONROE COAL AND IRON COMPANY'S ESTATE,

IN M'KEAN COUNTY, PENNA.,

BY P. W. SHEAFER,

LATE OF THE STATE GEOLOGICAL SURVEY.

This report besides treating of the geological features of the tract in question and the character of its mineral products, its soil, and timber, will take into consideration its economical and industrial relations, its market facilities, the extent and solidity of its commercial prospects; all these subjects are correlative to each other, and the discussion of any one of them alone would have but little practical value. In attempting such a review of a question so important as the commercial value and position of the coal field here considered, I am acquitted of the impropriety of departing from the strict routine of a purely geological report, by your request that I would communicate, so far as my information extends, whatever, in my opinion, may have an important connection with the interests of the property.

It will therefore be proper to consider first the physical features of the estate and then its commercial resources.

The lands in question. represented on the accompanying map, embrace the original warrants numbered 2381, 2386 and 2914, together with parts of those numbered 2384, 2455, 2474, 2862, known as the Portage lands, besides part of No. 2411 on Robin's brook, and part of No. 2274 on Coal Creek, both branches of Potatoe Creek, a tribu-

tary of the Allegheny emptying into that river about 9 miles north of Port Allegheny. The Portage tracts are situated upon the mountains, dividing the waters which flowing eastwardly into the Allegheny, from those which run West into Potatoe Creek. The drainage southward into the Susquehanna River also begins here, as the Portage branch of the Sinnemahoning, a large tributary of the Susquehanna, rises on these lands and flows southwardly, hence the name of the Portage lands.

This water shed, upon which your estate is situated, is among the most elevated land in the county, and for this reason it must contain a larger number of the coal strata than can be found on adjacent lands of less elevation.

Every mineral region has its peculiarities of formation in details, and only after being worked or very thoroughly proved by shaftings, can we be sure that all its resources are known.

The mineral treasures of the estate are but imperfectly developed, but enough is certainly known to establish, beyond doubt, the natural resources sufficient to encourage a liberal enterprise.

On tract No. 2474 and on a branch of Scaffold Lick Creek, a series of coal strata have been shafted, and although as yet only partially developed, the following cross section is known to represent the number and position of the coals actually found. Considering the circumstances which attended the exploration, this result, which establishes definitely the existence of a very valuable and abundant seam of coal, with others of less note, but nevertheless available, must be considered highly satisfactory.

Cross section of Coals opened on the Monroe Coal Company's Portage Lands, Lyman's Camp, in McKean County, Pennsylvania:

40 feet of undeveloped strata.

1. Wash of a Coal vein.

40 feet of undeveloped strata.

2. 2 feet good coal, with iron ore in top slate.

3. 5 feet of good coal.

12 feet of shales.

4. 1 foot of coal.
2 feet of coal.

4 feet of intervening strata.

5. 1 foot 4 inches coal.

Cannel Coal.

Conglomerate.

Iron ore.

Limestone.

A careful attention to this cross section will convince us that we have here the very same series of coal strata as was found by Prof. James Hall, upon the lands of the Lafayette Coal Company, in this county. On account of the great height of the strata above the five feet coal, we have here a coal seam of two feet overlying it. Above the two foot vein, the wash or discoloration of the ground which is found near all the coal veins, was observed, indicating that there are yet other seams which may reward judicious exploration. The identity of the five foot vein with that of the same size upon the lands of the Lafayette

Company, is demonstrated by its position with regard to the conglomerate, which forms the bottom of the whole carboniferous formation, the situation of which is entirely certain upon both properties. I would here cite and express my concurrence in a remark of Prof. Hall made whilst publicly addressing the people of Buffalo, some two years since, upon the importance of constructing a railway to bring to that city the coal of McKean County. He distinctly stated that the coal did not deteriorate in quality from the general character of the Bituminous Coals of Pennsylvania; in fact, that the coal formations of McKean County belonged to one great carboniferous formation, of which portions have been removed by denudation. The coals of McKean County were, therefore, virtually as much a part of the great formation of Pennsylvania as if they had never been surrounded by territory which has been denuded, and the coal is essentially of the same general character as that of the larger deposits. The Portage Coal was once a part of the same great bed, but denudation has removed the coal from a portion of the county lying between the Portage and Lafayette districts. The coal is evidently the same, and for further proofs of its quality, I would particularly refer to the analysis of Prof. Booth. The coal of the five foot vein, which I principally rely on as a productive bed, shows no sulphur in appreciable quantities. It contains 51.20 per cent. of fixed carbon, which is within 3.73 parts in 100 as much as the celebrated Pittsburg Coal, and within 6.16 as much volatile matter—say 30.60 per cent.—and it has 2.39 parts more fixed carbon than the *Scotch Coal.* Some of the smaller veins, it will be perceived, offer more favorable comparison, or are even superior in their analysis to Bituminous Coals of established reputation. The two and a half foot vein contains 54.35 per cent. of fixed carbon, and 36.45 per cent. of volatile matter. It is but

just to say, that the above analysis is of crop coal, which is not so good as that in the body of the vein. Enough, however, is shown by this to establish the coal of these beds as a good, servicable fuel, fit to enter the market, and rely on its quality to make its way extensively among the consumers of mineral fuel; but, as will hereafter appear, the coals of McKean are the only ones favorably placed by nature for the supply of a populous and rapidly progressing portion of this State of New York, and adjacent districts. It is, therefore, difficult to conceive how these deposits of fuel can be regarded as unimportant by the man of business, since they must assume a conspicuous position in the market.

Of the *Cannel Coals*, two openings were found—the one about twelve feet thick, consisting of Cannel Coal, of good quality, accompanied by shales, which vary in their composition from the nature of coal to that of a Bituminous shale. It is not easy to define precisely the thickness of the bench, which may be taken as pure Cannel Coal; but it is certain that a large amount of that valuable mineral must be contained in this bed. The other bed, perhaps a part of the former, is from two and a half to three feet thick, mostly good coal, with 25.50 per cent. of volatile matter. The distillation of Cannel Coal, and some kinds of Bituminous Coals, for the sake of the illuminating oils thus obtained, is a process lately risen to great importance, and bids fair to become one of the most prominent uses to which this class of mineral fuel will be applied. A company has been lately organised in western Pennsylvania for the manufacture of oil from Cannel Coal, and the profit is found to exceed, by far, that which can be realised for the sale of the coal for gas-making, and other purposes. The experience of this company has established a point of great importance, viz:—That some of the shales accompanying the Cannel Coal veins, al-

though unfit for fuel, *contain as much oil as the coal itself.* In estimating the quantity of coal contained within the estate, I shall consider, principally, the Bituminous Coals, the average thickness of whose beds, as far as known, may be assumed with reasonable certainty. The five foot vein, and the two veins of two feet of Bituminous Coal, make, together, a thickness of nine feet; and assuming but three feet of Cannel Coal, although, as before stated, if the rest be shale, its value for distillation of oils must not be overlooked, there results an aggregate thickness of twelve feet, which is equal to 20,000 tons per acre, or 120,000,000 tons for the whole estate. This enormous quantity could not all be mined, even were it possible to work it at a rate which would exhaust it within a conceivable period of time—a portion must be wasted, and a portion must also remain in the mines to form pillars for the support of the roof. But, as before remarked, I rely principally upon the five foot vein. This coal seam is large enough to supply a very large quantity for many years, and it is just of that size which makes it suitable for cheap mining; it is large enough to permit free access and convenient labor, but not so large as to require heavy timbering, or extensive methods, to render mining a safe operation. The drainage will be easy, because the lands are cut by the water courses below the level of the coals, which circumstance also makes it practicable to enter upon the veins at various points, and affords a good opportunity of choosing any number of sites for mining operations, with reference to facility for transportation, or other important objects. Assuming the average thickness of the five foot vein to be one and one-half yards, which is somewhat less than was developed by the shaftings, there will be 7260 cubic yards of coal per acre, or the same number of tons according to the usual method of computation. In round numbers, then, 7000 tons per

acre, or 42,000,000 of tons upon the whole estate. This vast quantity would not be exhausted in less than a century by an annual yield of 400,000 tons.

FIRE CLAY.

Accompanying the coal, and forming the floor of the vein, both in the five foot seam and the others, is a valuable, although not very heavy, deposit of fire clay. Even should this clay not become important for the manufacture of fire brick for exportation, although no reason appears why they may not be sold, it must be considered as important for its productive utility, in case of the erection of furnaces for smelting the iron ores of the estate.

IRON ORE.

The iron ores cannot be said to be exceedingly rich, but one, at least is a workable ore, and the others may be available, by proper treatment, with lime. The best of the ores yield, of metallic iron, 34.65 parts per hundred. It will be seen that this is an ore of considerable value. The highest yield of five ore banks in Yorkshire, England, was 38.8 of metallic ore—the lowest 31.6—the mean, 35.8. These are considered valuable seams. Of eight different ores from the Scotch Coal field, the highest yield was 40.9, the lowest 28.4.

Though these ores are not as rich as many others, they will make good iron, and in connection with the natural facilities of the lands, their advantages in the possession of the agricultural elements for the support of a manufacturing and mining population, and above all the cheapness of the fuel necessary for smelting the ores, we may conclude that the making of iron is an enterprise which may be undertaken with confidence of success. It should also be borne in mind that no iron furnace now exist in this district, and that the products of richer ores must be greatly enhanced in price by transportation from a great distance.

LIME STONE.

It is scarcely necessary to speak at length of the limestone—it is found in ample abundance for the development of the mineral and agricultural resources of the land. One of the limestones is stated by Professor Booth to be "unusually pure," yielding 94.59 per cent. of carbonate of lime, while the fossiliferous limestone, which lies below the conglomerate, yields 55.44 per cent.

TIMBER.

The timber is abundant for all the purposes of a mining district, an advantage by no means to be undervalued.—Hemlock timber abounds in the valleys, and upon the hills are to be found beach, birch, maple, and other varieties. For every ton of coal mined a certain quantity of timber must be used, and this cannot be so cheaply furnished as when cut upon the coal tract itself. Ten feet of timber to every ton of coal will not be an extravagant estimate.

SOIL.

We have now to speak of the soil and its capabilities. I do not imagine that such a region could come into successful competition with more favored agricultural districts in a distant market, but the importance of the cultivation of the surface, in connection with mining operations, should be fully understood by those possessed of mineral lands, which are susceptible of cultivation. Mining operations require the consumption of large quantities of agricultural products for the support of a numerous force, both of men and animals. It is true that in the Anthracite Coal region very little attention is given to agriculture, but the Bituminous districts are much more favorably constituted in this respect. The shales and rocks which intervene between the coal beds, are of a much softer nature; they disintegrate so readily by the action of the atmosphere,

that an arable soil is to be found in situations which, if located among the hard measures of the Anthracite region, would be unfit for cultivation. The presence of the limestone upon the property in question, affords a ready means of fertilizing the soil, and gives to this estate an increased power for the development of its resources.

MARKETS.

The market for the coals of McKean County, being the western part of New York, the lakes and the Canada frontier, the great lines of communication which afford an outlet in these directions, are those which especially concern us. A few remarks upon the importance of the trade of the regions, with which the coal fields of the county would then be brought into connection, may perhaps not be out of place.

The part of New York westward of Seneca Lake, and as will be seen by the map, which fairly comes within the scope of the improvements which centre at Olean, contains at present a population of not less than three-quarters of a million—a population distinguished for industry and enterprise. The rapid growth of new towns in this section of the state is well known. The population of Buffalo alone is more than sixty thousand, of Rochester forty-five thousand. Buffalo has fourteen iron foundries, and upward of thirty other establishments where steam is used as a motive power. Besides this there is a water works and a gas works. The improvements in gas works have been so great, that in a few years many of the small towns will undoubtedly have such establishments.

The demand for the coals of McKean County for gas making, both in this region and in Canada, must, if the mines be opened, become very large, because they are well adapted for the purpose, and because there is no gas making coal near enough to offer any competition.

Besides the territory of 7000 square miles which constitute western New York, there is at least twice that area in the surface of lakes Erie and Ontario. This broad expanse is covered with an active trade whose extent is often overlooked, because it escapes the observation of those not immediately concerned.

The shipments from the port of Cleveland during several successive years will furnish some idea of the extent and probable increase of this trade.

	BUSH. OF COAL.
Shipments in Cleveland, in 1840,	167,045
" " " " 1845,	889,880
" " " " 1850,	2,347,844
" " " " 1854.	7,000,000

The port of Buffalo, and its commercial importance, is thus spoken of in the report submitted to the Senate of the United States, in 1853. by Mr. Andrews, upon the "Trade and commerce of the British North American Colonies, and the trade of the Great Lakes and Rivers;" see page 89.

"Buffalo occupies a commanding business situation at the western terminus of the Erie canal, and the eastern terminus of Lake Erie, constituting as it were the *great natural gateway*; between the marts of the east and the producing regions of the west, for the passage of the lake commerce, it is distant from Rochester 73 miles, and from Cleveland 203 miles." We have already seen that the transports of coal from the west must be very expensive. As Buffalo is only 100 miles from the McKean coal fields, it is plain that coals shipped from Cleveland could not complete in the Buffalo market and markets further east, with the coals of McKean.

According to Mr. Andrews, the total tonnage of the port of Buffalo is as follows:

1830, - - - -	16,300 tons.
1835, - - -	30,602 "
1841, - - - -	55,181 "
1846, - - -	90,000 "
1851, - - - -	153,426 "

Mr. Andrews further says:—"Astonishing and unprecedented as is this increase, it yet gives no adequate idea of the increase of business transacted by it, &c., &c."

Again, "Buffalo has a commerce larger than any other lake district in the United States, very nearly one-third of the whole." Such is the port which forms the western terminus upon Lake Erie, of the chain of railroad lines only 100 miles in length, which will connect the coal fields of McKean with its great mart in this direction. The terminus on lake Ontario is Rochester, which is a port of entry, and has a large trade with Canada.—There were exported from Canada to Rochester in 1851 goods to the value of $913,615. This city exhibits the same rapid advancement as is seen in the other centres of trade in western New York:

	POPULATION.
1820, - - - -	1,502
1830, - - - -	9,269
1840, - - - -	20,191
1850, - - - -	36,403

The distance from the coal fields to Rochester is 140 miles. Comparing the distance of Rochester and Buffalo from the mines, we see they are as near as New York and Philadelphia to the Anthracite Coal fields, yet the coal is not nearly all consumed in these cities, but by far the greater part is shipped to the Eastern States or southward.

Before speaking of the important outlets to market, I would call attention to the work which would be necessary before the McKean lands can be brought into con-

nection with the markets above alluded to. The route of a railroad, which would immediately open the Monroe Company's lands, without waiting for the construction of new lines, would be down the valley of Potatoe Creek to the Allegheny River, and thence down that stream to Olean, a total distance of about thirty-six miles. The ground along this route is favorable for the cheap construction of a railroad, and the grade will be gently descending in favor of the transport from the mines. It is to such a grade which enables the motive power to take to market as much coal as can be contained in the empty wagons brought up to the mines, that the Philadelphia & Reading Railroad is mainly indebted for its ability of cheap transportation. Fortunately for the interests of this estate the Allegheny Valley Railroad covers this important route; and 43 miles of the southern end of the railroad line, above described, is already completed from Pittsburg to Kittanning; and, it appears to me, that an enlightened policy would dictate to the managers the advantages to be derived from a speedy completion of the other end of the route. It is obvious, that the trade from the interior of the State can only be remunerative in connection with the termini of the railroad, and it is for the interest of the work to stimulate that central region to activity, by affording an outlet, as soon as possible, to its products, in the direction of either of the great markets. As a question of temporary expediency merely, the completion of some 30 miles of railroad, from McKean County to the State line, is clearly apparent, for here are important branches of commerce only waiting this stimulus to start it into activity. Such was the original policy and intention of the Allegheny Valley Railroad Company.—Their contracts stipulated for the completion of this end of the route within a year after finishing the Pittsburg end; and to secure this object, negotiations for assistance

with the New York companies, which had commenced their improvements in expectation of common commercial interests with the Allegheny Valley Road. It should be the duty of the citizens of McKean County to urge on the management of this road, the advantages of adhering to its primitive policy, and also to support their arguments by the practical and significant action of strenuous efforts for contributing pecuniary aid. Should it, however, not be possible to bring about the construction of the railroad, the establishment of a slack water navigation along the Allegheny River would afford an all-sufficient outlet for the trade of McKean County, at a cost almost within the power of the citizens themselves. From Smithport to Olean, a distance of 30 miles, the fall in the river is but 30 feet. This very gradual descent would make the construction of the necessary dams and locks very cheap, and would also protect the works against the violence of freshets. The locks being few, the wages of the lock-tenders would be not very considerable, and the whole maintenance of the work more than ordinarily cheap. But the true plan of securing the speedy construction of a water line adequate to the trade of the region, which we propose to open, and the plan also most advisable, in view of the works already in progress, as well as in point of economy and facility of execution, is to continue the Genesee Valley Canal, from the first lock north-east of Olean across the bottom land lying between that point and the Allegheny, a distance of about seven miles, into Millgrove dam, upon that river, which would at once give a navigable water level, or slack water transportation, to the mouth of Potatoe Creek, seveneten miles above Olean.

It is scarcely to bedoubted, that if the subject were properly urged upon the attention of the New York Canal Commissioners, that the proposed work would be adopted,

especially since the present plan for the completion of the Genesee Valley Canal requires the construction of two large and expensive outlet locks below Olean. The money intended for this purpose would, if applied to the modification suggested, go far to complete it, and to secure at once a very considerable accession of trade to the canal. Should the locks below Olean be adopted, according to the present plan, there would yet remain the improvement of the river, between Olean and Millgrove dam, before any increase of trade on the canal could be expected from the coal fields of McKean County. So confident do I feel of the cheapness and general eligibility of a slack water improvement, either direct, as at first proposed, or by the Genessee Valley modification, that I would urge on the owners of coal lands in McKean County to procure a reconnoisance and report of probable cost from some engineer of known skill and experience, upon both projects for the construction of a suitable water line. The railroad, if finished according to the original plan, would terminate at Ceres, in McKean County, near the State line, but would be extended within the territory of New York to join the Corning and Olean Railroad, within a few miles of Olean. This town forms a centre from which diverges a net-work of railroads and other improvements, which it is impossible to consider in detail in regard to the markets with which each is connected. A glance at the map of New York, the routes on which are the same as one officially submitted to the senate of that State, and prepared with special reference to its railroad and water lines, by the State engineer and surveyor, will do more to explain the advantageous position of the Monroe Company's coal fields, than a labored description of the various routes and their business relations. I shall briefly enumerate some of them, which have a direct communication with the terminus of the Allegheny Valley Railroad, either through Olean or otherwise.

1st. The New York and Erie Railroad accommodates the local trade of southern and western New York and northern Pennsylvania.

2nd. The Genesee Valley Canal, extending from Rochester, where it intersects the Erie Canal, to Olean, a distance of one hundred and seven miles. This improvement is peculiarly adapted to the transport of coal, and passes through a densely populated region, where a demand for mineral fuel must arise whenever it can be furnished at reasonable rates.

3rd. The Corning and Olean Railroad. It shortens the circuitous route by the New York and Erie Railroad, and connects at Corning with the Chemung Canal, the Conhocton Valley Railroad. and other important improvements.

4th. The Buffalo and Pittsburg Railroad, from Buffalo to Olean, offers a direct communication of 75 miles, with the trade of Lake Erie at Buffalo.

5th. The Attica and Allegheny Valley Railroad, which, diverging from the Buffalo and Pittsburg Railroad, joins the Buffalo and New York City Railroad at Attica, thus opening a full communication with the lines which run parallel and near to the southern shore of Lake Ontario. These are all works of high importance, traversing a country of great wealth and prosperity. The construction of so many improvements of such magnitude, testifies at once both to the value of the trade of the lakes, and the local trade of the country traversed by these various lines.

If we consult the map in the above enumeration of the lines of transport, we shall perceive that Olean is the centre of a most important system of improvements, which afford full access to the various districts of western New York and to the lake ports. It would be difficult to obtain correct statistical information concerning the vast

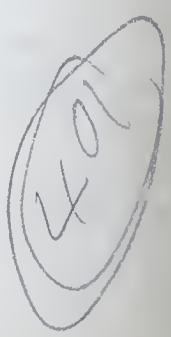
business of the regions which are reached by these routes, and still more difficult to exhibit the result in a condensed form. It is an admitted fact that mineral fuel will be preferred wherever it can be afforded at reasonable rates, but in Western New York and for the steam marine of the lakes, coal is even now almost indispensable. The principal source of supply of Bituminous Coals to western New York, is from the ports of Erie and Cleveland. If the transportation is by railroad, a greatly increased rate of freight is added to the price of coal, and the cheaper water transportation of the lake cannot be availed of, because the heavy carriage is eastward; but in shipping the McKean County Coal westward from Buffalo, it could be taken as ballast or return freight at very low rates. The consumption of coal by that portion of the steam marine of Lake Erie, which trades with the port of Buffalo, alone is estimated as at least equal to 1000 tons per day, or 300,000 tons per annum. This amount of traffic and more could be secured to any parties who could deliver coal at Buffalo as cheaply as it is to be obtained at Erie, for vessels discharging their cargoes at Buffalo are obliged to take in sand for ballast on the return trip—such vessels would purchase coal for supplying the lake ports.—The Canadian frontier would thus open a market for the coal of Pennsylvania, and the growing importance of this trade is fully recognized. The late treaty of reciprocity with Great Britain opens the colonial ports to our vessels, so that in considering the prospect of the coal trade, we have only to inquire into the wants and necessities of the country. This is a matter easily understood. Canada having no coal of her own must draw the supply for their manufactories, now placed on an equal footing with those of the adjacent ports of the United States, from our territory, and the proximity of the McKean County coal fields, must give them great advantages in competing for this trade.

The prosperity and active business of western New York, as also the present magnitude and prospective importance of the lake commerce, have been too frequently and too ably discussed to need a formal exhibition in this place. These elements were thoroughly considered by the projectors of those important works, the Sunbury and Erie Railroad and the Allegheny Valley Railroad; to the reports of those companies we refer the reader who desires to investigate the subject, and especially to the able communication of ex-Governor W. F. Johnson, President of the Allegheny Valley Railroad Company. In possession of an ample domain, endowed with such mineral wealth and the facilities for its distribution, it appears to me that nothing but a well-directed enterprise is needed to render your estate productive, and give to it an important commercial position.

I am, very respectfully,

Your obt. st.

P. W. SHEAFFER.

To the Directors of the
Monroe Coal Company.

Pottsville, Jan. 1856.